INCH-POUND

MIL-PRF-1/1314C
8 July 1999
SUPERSEDING
MIL-E-1/1314B
1 February 1972

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, POWER
TYPES 6283 AND 8500

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the electron tube described herein shall consist of this document and the latest issue of MIL-PRF-1.

DESCRIPTION: Tetrode.

See figures 1 and 2.

Mounting position: Any.

Weight: 1 pound nominal.

ABSOLUTE RATINGS: F1 = 400 MHz and F2 = 900 MHz. 1/ 2/

Parameter:	Ef	Eb	Ec1	Ec2	Ic1	Ib
Unit:	V	kV dc	V dc	V dc	mA dc	mA dc
Maximum:						
Class C Teleg: (900 MHz)	6.8	1.6	-100	320	50	300
Class B RF: (400 MHz)	6.8	2.0	---	320	50	250
Test conditions:	6.3	1.0	Adj	Adj	---	---

ABSOLUTE RATINGS:

Parameter:	Cooling	Pg1	Pg2	Pp	Pi	tk
Unit:	1/	W	W	W	W	sec
Maximum:						
Class C Teleg: (900 MHz)	---	2	15	480	480	60
Class B RF: (400 MHz)	---	---	5	500	500	60
Test conditions:	---	---	---	---	---	60

GENERAL:

Qualification: Required.

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

TABLE I. Testing and inspection.

Inspection	Method	Types	Conditions	Acceptance level	Inspection level or code	Symbol	Limits		Unit
							Min	Max	
Qualification									
Life-test	---	6283	F = 1050 ± 50 MHz; Ef = 2/; Eb = 5,000 V dc; Ec2 = 1,000 V dc; Ec1 = -200 V dc; pd = 1.5 kw; tp = 5-15 µs; Du = 0.01 4/	---	---	t	500	---	hours
	2214	8500	F = 350 - 400 MHz 4/; Ef = 5.5 V; Eb = 2,000 V dc; Ec2 = Adjust; Ec1 = -40 V dc; Ib = 250 mA dc; Ic1 = 20 mA dc; t = 500 hours	---	---	Po	275	---	W
Life test end points:									
Power output	---	6283	F = 405-450 MHz; Ef = 6.3 V; Eb = 5,000 V dc; Ec2 = 1,000 v; Ec1 = -50 V dc; pd = 2.2 kw; tp = 15-17 µs; Du = .005 4/	---	---	Po	12.0	---	kw
Power output (1)	---	8500	F = 850 ± 50 MHz 4/; Eb = 1,500 V dc; Ec2 = Adjust; Ib = 300 mA dc; Rg = 2,000 ohms; Ic1 = 20 mA dc	---	---	Po Ic2	135 ----	---- 15	W (useful) mAdc
Pulsing emission sinusoid	1231	6283	3/	---	---	is	40	---	a
	---	8500		---	---	is	40	---	a
Conformance inspection, part 1									
Heater current	1301	Both		0.65	II	If	3.5	4.0	A
Total grid current	1266	6283	Ec1/Ib = 300 mA dc; Eb = 2,000 V dc; Ec2 = 300 V dc 7/	0.65	II	Ic1	---	-10.0	µA dc
	1266	8500	Ec/Ib = 300 mA dc; Eb = 2,000 V dc; Ec2 = 300 V dc 7/	0.65	II	Ic1	---	-7.0	µA dc

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method	Types	Conditions	Acceptance level	Inspection level or code	Symbol	Limits		Unit
							Min	Max	
Conformance inspection, part 1 - Continued									
Electrode voltage (grid) (cutoff)	1261	Both	Ec2 = 300 V dc; Ec1/Ib = 10 mA dc	0.65	II	Ec1	-23.0	-34.0	V dc
Pulsing emission sinusoid	1231	Both	ec1 = ec2 = eb = 750 V; tk = 90 3/	0.65	II	is	60.0	---	a
Power output	2214	6283	F = 405-450 MHz; Eb = 5,000 V dc; Ec2 = 1,000 v; Ec1 = -50 V dc; pd = 2.2 kw; tp = 15-17 µs; Du = .005 4/	0.65	II	Po	12.0	---	kw
Power output (1)	2214	8500	F = 850 ± 50 MHz 4/; Eb = 1,500 V dc; Ec2 = Adjust; Ib = 300 mA dc; Rg = 2,000 ohms; Ic1 = 20 mA dc	0.65	II	Po Ic2	140 ---	--- 15	W (useful) mA dc
Conformance inspection, part 2									
Low-frequency vibration	1031	Both	No voltage	---	---	---	---	---	---
Electrode voltage (1) (grid)	1261	Both	Ec2 = 300 V dc; Ib = 200 mA	---	---	Ec1	-8	-15	V dc
Electrode voltage (2) (grid)	1261	Both	Ec2 = 250 V dc; Ib = 200 mA	---	---	Ec1	-5	-11	V dc
Electrode voltage (3) (grid)	1261	Both	Ec2 = 300 V dc; Ib = 250 mA	---	---	Ec1	-5	-12	V dc
Amplification factor	1316	Both	5/	---	---	Mu	11	17	
Transconductance	1306	Both	6/	---	---	Sm	20,000	---	µmhos
Direct-interelectrode capacitance	1331	6283	g1 to g2 (anode grounded) g1 to g2 (cathode grounded)	--- ---	--- ---	Cin Cout	17 6.1	19.5 6.7	pF pF
	1331	8500	g1 to g2 (anode grounded) g1 to g2 (cathode grounded)	--- ---	--- ---	Cin Cout	18 6.1	21 6.7	pF pF

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method	Types	Conditions	Acceptance level	Inspection level or code	Symbol	Limits		Unit
							Min	Max	
Conformance inspection, part 3									
Life test	---	6283	Group D F = 1050 ± 50 MHz; Ef = 2/; Eb = 5,000 V dc; Ec2 = 1,000 V dc; Ec1 = -200 V dc; pd = 1.5 kw; tp = 5-15 µs; Du = 0.01 4/	---	---	t	500	---	hours
Life test (2) provisions	---	8500	Group D; F = 850 ± 50 MHz 4/; Eb = 1,500 V dc; Ec2 = Adjust; Ib = 300 mA dc; Rg = 2,000 ohms; Ic1 = 20 mA dc; Ef = 5.5 V; t = 500 hours	---	---	--- Po Ic2	--- 140 ---	--- --- 15	--- W (useful) mA dc
Life test end points	---	6283	Power output F = 405-450 MHz; Ef = 6.3 V; Eb = 5,000 V dc; Ec2 = 1,000 V; Ec1 = -50 V dc; pd = 2.2 kw; tp = 15-17 µs; Du = .005 4/	---	---	Po	12.0	---	kw
Life-test (2) end points	---	8500	Power output (1) F = 850 ± 50 MHz 4/; Eb = 1,500 V dc; Ec2 = Adjust; Ib = 300 mA dc; Rg = 2,000 ohms; Ic1 = 20 mA dc	---	---	Po Ic2	135 ---	--- 20	W (useful) mA dc
			Pulsing emission sinusoid 3/	---	---	is	40	---	a

See footnotes at top of next page.

TABLE I. Testing and inspection - Continued.

1/ Airflow through the radiators required for cooling at sea level shall meet the following:

Anode dissipation	500 W
Airflow	17 cfm (min)
Static pressure	0.90 Inch (H_2O) (approximate)
Heater-cathode seals	1.0 cfm (min)
Screen-grid control-grid seals	1.0 cfm (min)
Incoming air temperature	45°C (max)
Radiator hub temperature (at fin adjacent to anode seal)	250°C (max)
Tube temperature (at any point)	200°C (max)

Cooling shall be applied prior to and during application of any voltages and shall be maintained for 1 minute after the removal of all voltages. Provision shall be made for unobstructed passage of cooling air between radiator fins and between the anode terminal and adjacent radiator fin. The volume of cooling air indicated for various seals is only approximate. Distribution of cooling air may vary with the cavity configuration about the tube. For most satisfactory operation, the maximum temperature at any point on the tube shall be below 200°C.

2/ The cathode of the tube, because of transit time effects which raise the temperature of the cathode is subject to considerable back bombardment in ultra-high frequency service. The amount of heating due to bombardment is a function of the operating conditions and frequency, and must be compensated for by a reduction of the heater input to prevent over heating of the cathode with resulting short life. For long life, tube type 6283 and 8500 should be put in operation with rated heater voltage. After the circuit has been adjusted for proper tube operation, the heater voltage should be reduced to a value slightly above that at which circuit performance is affected. In any case, it is important from a tube life standpoint to keep the filament voltage at as low a level as possible consistent with required performance. However, the filament voltage should not be reduced below 5.5 volts. At a frequency of 900 MHz and with typical operating conditions, the the heater voltage can be reduced to approximately 5.5 volts. At lower frequencies, the reduction will be less. Minor circuit readjustment may be necessary after this adjustment. The procedure for determining proper heater power should be repeated periodically.

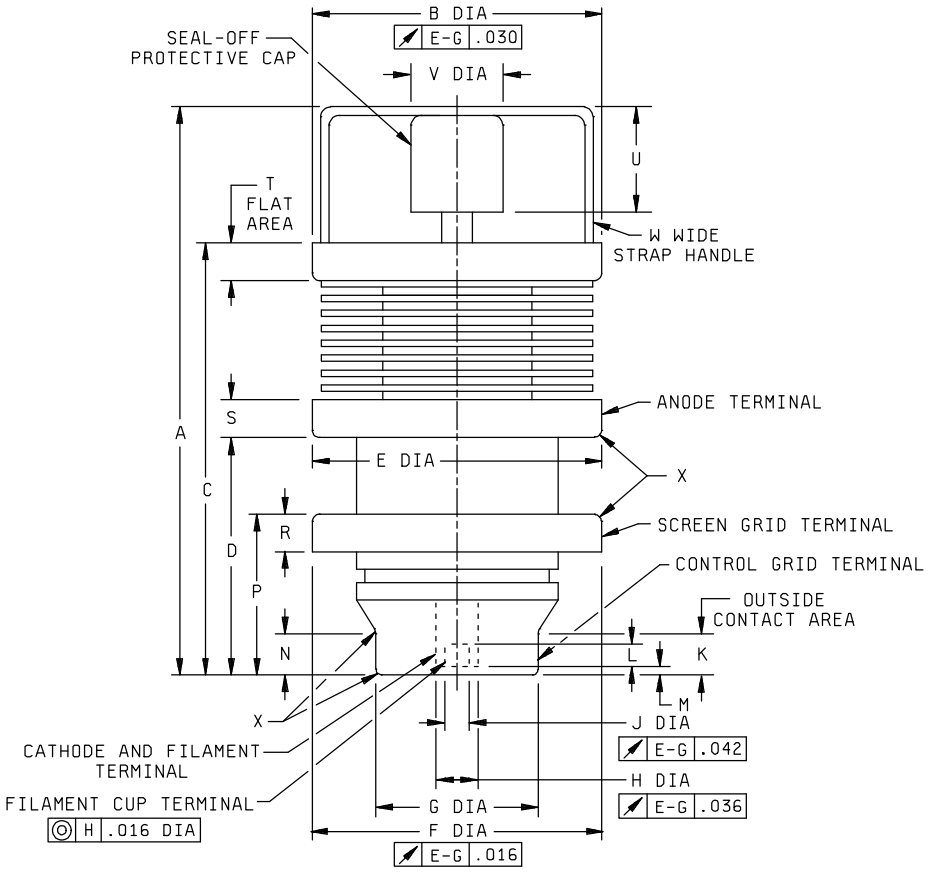
3/ Applied voltage shall be approximately sinusoidal. The pulse duration 2 to 3.5 µs, prr = 60.

4/ Any frequency within the specified range may be used.

5/ This test shall be for screen grid to control-grid amplification factor and shall be calculated by dividing the difference in Ec2 (50 V) by the difference in Ec1 as read from the electrode voltage (1) (grid) and electrode voltage (2) (grid) tests.

6/ This test shall be calculated by dividing 50,000 by the difference in Ec1 as read from the electrode voltage (1) and the electrode voltage (3) (grid) tests.

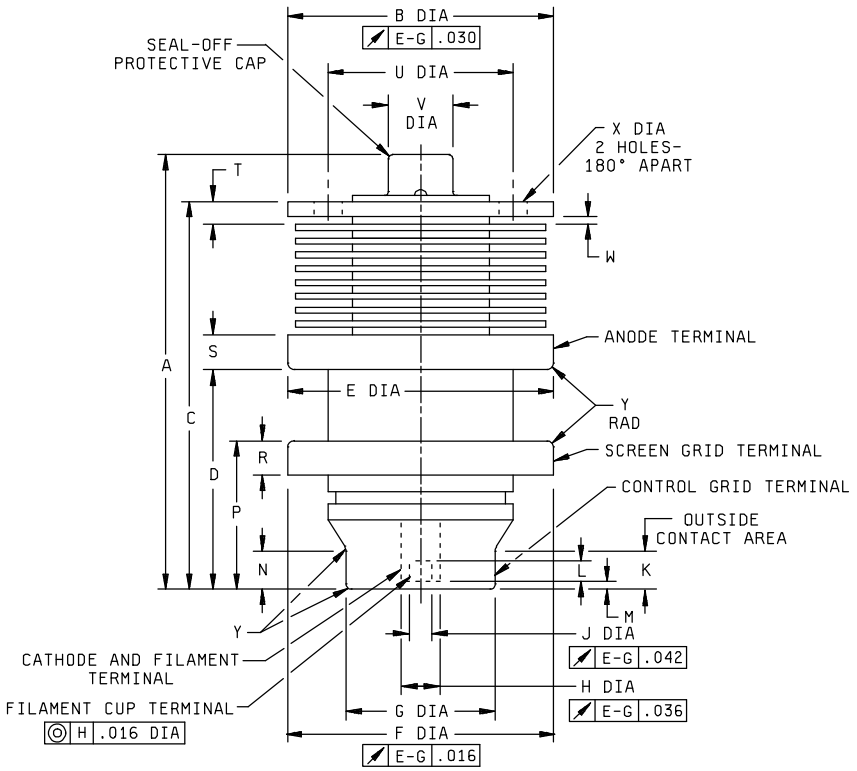
7/ This test is to be the first test performed at the conclusion of the holding period.



Dimensions														
	Inches		Millimeters			Inches		Millimeters			Inches		Millimeters	
Ltr	Min	Max	Min	Max	Ltr	Min	Max	Min	Max	Ltr	Min	Max	Min	Max
Conformance inspection, part 2														
A	4.094	4.344	103.99	110.34	H	.320	.328	8.13	8.33	R	.250	.313	6.35	7.95
B	2.303	2.323	58.50	59.00	J	.181	.191	4.60	4.85	S	.281	.312	7.14	7.92
C	3.047	3.234	77.39	82.14	K	.375	---	9.53	---	T	.188	---	4.78	---
D	1.672	1.765	42.47	44.83	L	.188	---	4.78	---	U	.688	.813	17.48	20.65
E	2.271	2.291	57.68	58.19	M	.063	.125	1.60	3.18	V	.625	.750	15.88	19.05
F	2.115	2.135	53.72	54.23	N	.250	---	6.35	---	W	.344	.406	8.74	10.31
G	1.302	1.322	33.07	33.58	P	1.063	1.125	27.00	28.58	X	---	.047	---	1.19

NOTES:
1. Metric equivalents (to the nearest .01 mm) are given for general information only and are based upon 1 inch = 25.4 mm.
2. Bottom of cup must not be used as a socket stop.

FIGURE 1. Outline drawing of electron tube type 6283.



Dimensions									
Ltr	Inches		Millimeters		Ltr	Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
Conformance inspection, part 2									
A	3.297	3.453	83.74	87.71	M	.063	.125	1.60	3.18
B	2.303	2.323	58.50	59.00	N	.250	---	6.35	---
C	2.921	3.047	74.19	77.39	P	1.063	1.125	27.00	28.58
D	1.672	1.765	42.47	44.83	R	.250	.313	6.35	7.95
E	2.271	2.291	57.68	58.19	S	.281	.312	7.14	7.92
F	2.115	2.135	53.72	54.23	T	.109	.141	2.77	3.58
G	1.302	1.322	33.07	33.58	U	1.615	1.635	41.02	41.53
H	.320	.328	8.13	8.33	V	.500	.625	12.70	15.88
J	.181	.191	4.60	4.85	W	.063	---	1.60	---
K	.375	---	9.53	---	X	.256	.276	6.50	7.01
L	.188	---	4.78	---	Y	---	.047	---	1.19

NOTES:
1. Metric equivalents (to the nearest .01 mm) are given for general information only and are based upon 1 inch = 25.4 mm.
2. Bottom of cup must not be used as a socket stop.

FIGURE 2. Outline drawing of electron tube type 8500.

Custodian:
Army - CR
Navy - EC
Air Force - 11
DLA - CC

Review activities:
Air Force - 17

Preparing activity:
DLA - CC

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